DOCUMENT RESUME

ED 223 778 CE 033 597

TITLE	Training of Occupational Health Personnel. Report on a Consultation (Belgrade, Yugoslavia, June 24-28, 1981). EURO Reports and Studies, 58.
INSTITUTION	World Health Organization, Copenhagen (Denmark). Regional Office for Europe.
REPORT NO	ISBN-92-890-1224-2
PUB DATE	82
NOTE	29p.
AVAILABLE FROM	WHO Publications Center USA, 49 Sheridan Avenue, Albany, NY 12210.
PUB TYPE	Collected Works - Conference Proceedings (021)
EDRS PRICE	MF01 Plus Postage. PC Not Available from EDRS.
DESCRIPTORS	*Allied Health Occupations Education; Allied Health Personnel; Clinical Experience; *Educational Needs; *Foreign Countries; Futures (of Society); Interdisciplinary Approach; Medical Education; *Occupational Safety and Health; Technological Advancement
IDENTIFIERS	*Europe

ABSTRACT

The present situation and the future needs in training of occupational health personnel were studied in a consultation held by the Regional Office for Europe of the World Health Organization together with the Government of Yugoslavia. Approaches to training were reviewed for these countries: Bulgaria, Finland, the Federal Republic of Germany, Hungary, Italy, Norway, Poland, Sweden, the Union of Soviet Socialist Republics, the United Kingdom, Yugoslavia, and some other member states of the European community. Attention was also given to problems in occupational health that have arisen from new technological developments (psychological stresses, use of dangerous pathogens and new physical agents in research and production) and from new biological knowledge (undefinable thresholds to exposure to various substances and risk of teratogenicity). New requirements for training that were recommended included both multidisciplinary and interdisciplinary training in occupational health and practical training. Some conclusions were that occupational health specialists must become more specialized, that the value of many routine medical tests should be questioned, that practitioners of occupational medicine must be competent in clinical medicine, that an enormous need exists for development in the field of mental health, and that communication training is needed. (YLB)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED223778

EURO Reports and Studies
58

Training of occupational health personnel

Report on a Consultation

U.S. DEPARTMENT OF EDUCATION
NATIONAL INSTITUTE OF EDUCATION
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

✓ This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official NIE position or policy.

"PERMISSION TO REPRODUCE THIS MATERIAL IN MICROFICHE ONLY HAS BEEN GRANTED BY

M Jones

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

Belgrade
24-28 June 1981

CE 033 597

REGIONAL OFFICE FOR EUROPE
World Health Organization
COPENHAGEN
1982

ICP/WKH 010

ISBN 92 890 1224 2

© World Health Organization 1982

Publications of the World Health Organization enjoy copyright protection in accordance with the provisions of Protocol 2 of the Universal Copyright Convention. For rights of reproduction or translation, in part or *in toto*, of publications issued by the WHO Regional Office for Europe application should be made to the Regional Office for Europe, Scherfigsvej 8, DK-2100 Copenhagen Ø, Denmark. The Regional Office welcomes such applications.

The designations employed and the presentation of the material in this publication do not imply the expression of any opinion whatsoever on the part of the Secretariat of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

The mention of specific companies or of certain manufacturers' products does not imply that they are endorsed or recommended by the World Health Organization in preference to others of a similar nature that are not mentioned. Errors and omissions excepted, the names of proprietary products are distinguished by initial capital letters.

The views expressed in this publication are those of the participants in the Consultation and do not necessarily represent the decisions or the stated policy of the World Health Organization.

PRINTED IN DENMARK

CONTENTS

	Page
Introduction	1
Approaches to training in various countries	3
Bulgaria	3
Finland	3
Federal Republic of Germany	4
Hungary	5
Italy	6
Norway	6
Poland	8
Sweden	9
Union of Soviet Socialist Republics	10
United Kingdom	11
Yugoslavia	11
Other member states of the European Community	12
New problems in occupational health	13
New technological developments	13
New biological knowledge	14
Social and political aspects	14
New requirements in training	15
Multidisciplinary (integrated) training	16
Interdisciplinary training	17
Preconditions for multidisciplinary and interdisciplinary training	18
Practical training	18
Conclusions	19
Annex List of participants	21

INTRODUCTION

A Consultation on Training of Occupational Health Personnel was held by the Regional Office for Europe of the World Health Organization together with the Government of Yugoslavia in Belgrade from 24 to 28 June 1981. It was attended by 12 temporary advisers from 11 countries of the European Region, a representative of the Commission of the European Communities and two observers from Yugoslavia. The objectives of the Consultation were:

(*a*) to review the existing training of occupational health personnel in Member States;

(*b*) to identify the requirements of occupational health services in relation to the training of the personnel concerned;

(*c*) to specify areas in which occupational health personnel should be trained;

(*d*) to examine training policies in the light of new technologies and new trends in occupational health.

The Consultation was opened by Dr M.I. Mikheev, Regional Officer for Workers' Health, of the Regional Office for Europe, who outlined the WHO programme aimed at the enhancement of workers' health and introduced Dr D. Komadina, Director, Federal Institute for Public Health, who described his country's interest in, and approach to the subject. He pointed out that changes in economic and social factors, and more particularly advances in technology, led to new problems of workers' health and to the need for new initiatives.

Professor M. Kilibarda was elected Chairman, with Dr J.H. Rantanen as Vice-Chairman. Dr K.P. Duncan was elected Rapporteur.

A background paper on the training of occupational health personnel had been prepared by Professor D. Djurić and Professor D. Popović, Institute of Occupational and Radiological Health, Belgrade. This

emphasized that the broad goals in the field of occupational health, as defined by the first Joint ILO/WHO Committee on Occupational Health, and subsequently endorsed by the governing bodies of those organizations, should be the promotion and maintenance of the highest degree of physical, mental and social wellbeing of workers in all occupations. From a historical point of view, the emphasis in occupational health had moved away to some extent from the detection of frank occupational disease in the direction of prevention and rehabilitation. The importance of team work in occupational health practice was also emphasized, and it was pointed out that the actual organization of occupational health and safety services varies from country to country, depending both on the aims of occupational health in a particular country and on the organization of other health services in that country. Some developments in countries outside the European Region were briefly considered and attention directed to the education and training, not only of doctors and other occupational health specialists, but also of managers, workers and foremen.

Research in occupational health has tended to focus increasingly on the detection of the most minute physical signs in the diagnosis of occupational diseases and on the application of the best physiological methods in the assessment of health impairment of occupational origin.

With the improvement of working conditions, the emphasis in occupational health practice has shifted from acute poisoning to delayed effects or the very early signs of health damage. Attention is thus focused on the disturbances of homeostatic and compensatory mechanisms, while biochemical, morphological and functional changes are still reversible. Major advances have been made by biochemists and toxicologists in analytical methods.

Numerous technologies call for the special attention of experts to be given to the problems of the adaptation of work to man. The need to adapt machines and the working environment to the psychosocial abilities of the worker, in conjunction with anthropometry, applied physiology, and occupational hygiene, has given rise to a new multidisciplinary science — ergonomics. This trend has brought occupational psychologists, psychiatrists and social workers into occupational health.

It is evident that there is a lack of trained occupational health personnel in the European Region. At the same time, there are obvious differences in the systems of training available for the various members of the team. WHO can play an important role in defining the tasks of occupational health services, in identifying the skills that must be included in the team, and in developing training programmes and organizing international educational initiatives.

The situation in a number of countries was then reviewed in the light of the foregoing.

APPROACHES TO TRAINING IN VARIOUS COUNTRIES

Bulgaria

In medical training, at the undergraduate level, occupational health is one of the subjects covered by the examinations in public health. At the postgraduate level a specialty in occupational disease is open to those who have specialized in internal medicine or occupational health. Industrial toxicology is also a specialty. Organizationally, occupational health forms part of the public health system and is the responsibility of the Hygiene and Epidemiology Inspectorate, which employs people who have been apprenticed to a specialist and passed an examination. Sanitary inspectors receive instruction in occupational hygiene and occupational diseases, and special attention is paid in their training to the mastering of the practical skills involved in carrying out state sanitary control in the field of occupational hygiene and to the measures necessary to improve working conditions and to protect the health and working capacity of workers.

A specialty in sanitary chemistry and sanitary engineering exists, open to specialists who have undergone higher technical education (chemists, engineers, physicists, etc.). The course is of three years' duration and the syllabus is approved by the Minister of Public Health. In order to qualify, a state examination must be passed before a board appointed by the Minister of Public Health.

Finland

There was a great expansion, between 1950 and 1980, in the number of doctors working in industry and, at the same time, increasing specialization, the tendency being to move away from medical health care and towards the identification and assessment of health risks. Much occupational hygiene work is centred on the Institute of Occupational Health and its regional institutes, but there is still a need for industrial hygienists to be trained.

Law No. 743 of 29 September 1978 on health care services in undertakings, which will be fully implemented by 1983, will have a major impact on such services, and the establishment of a new specialty in occupational health has helped to promote the planning and training programmes to be provided at the central and regional institutes, as well as in certain large companies and public institutions.

The training of occupational health nurses has been well established for some years; it follows basic training (3½ years) in public health. The new law has also produced proposals for changes in this specialty.

The training of industrial hygienists consists of a three-year postgraduate course, followed by an examination by a specialist committee. The Institute also provides practical training for psychologists wishing to work in the occupational health field. There is so far no official training or specialty for safety engineers, though basic training is provided by various technological institutes.

It should also be emphasized that the Finnish Institute of Occupational Health has provided international training in three ways:

(*a*) long-term (1–3 years) advanced training for specialists from other countries;

(*b*) modular courses in relevant areas of occupational health and hygiene, already attended by some 500 Nordic and 150 non-Scandinavian students;

(*c*) courses organized in developing countries, in collaboration with the Finnish Ministry of Foreign Affairs. So far about 160 students have undergone longer periods of training and some 500 have attended shorter courses in this way.

Federal Republic of Germany

Legal requirements in the field of occupational health were specified in the Law of 12 December 1973 on industrial medical officers, safety engineers, and other occupational safety experts. There is an increasing demand for medically trained experts. Since early in the 1970s, all medical students have been required to study occupational health as one of the subjects covered in the examinations. After graduation, physicians can acquire the title of doctor of occupational health (the higher degree of specialization) or industrial medical officer (the lower degree of specialization). The title "doctor of occupational health" or "occupational health physician" requires a supplementary training period of four years, two years being devoted to internal medicine and two years to practical work in occupational health. During this period, a three-month theoretical course on occupational health, which may be divided into at most three sections, must be completed at an institute of occupational health. Of the two years devoted to internal medicine, up to one year of specialized training can be in general medicine, surgery, dermatology, pulmonary and bronchial medicine, neurology and psychiatry, orthopaedics or accident surgery or, within this one year, up to six months in laboratory medicine, physiology or toxicology.

The other title of "industrial medical officer" requires:

(*a*) completion of a three-month theoretical course on occupational health, which may be divided into at most three sections;

(*b*) twelve months in a clinic or outpatient department in internal medicine;

(*c*) nine months' practical experience in occupational health with a doctor licensed by the competent *Land* (provincial) Chamber of Physicians.

The introductory courses can be taken in various ways, e.g. before starting work as a part-time industrial medical officer, and there is also a system of refresher courses.

The arrangements for the training of nonphysicians in occupational health have not yet been standardized but are now being discussed, since it is recognized that they make an important contribution to the quality and efficiency of the services. It is hoped soon that arrangements will be made with many institutes offering advanced training for nurses and medical assistants that will meet the identified training requirements.

The profession of safety engineer is recognized in the Federal Republic of Germany, but the term "occupational hygienist" is not used. Duties in the occupational hygiene field are shared by the factory medical officer and the safety engineer.

Hungary

In Hungary, occupational health services are provided by factory medical services and occupational hygiene services. Factory medical services date from 1951; since then, physicians and nurses working in a factory have been employed by the public health unit of the local council, not by the factory itself. Since 1975, the county hospitals and polyclinic units have been supplemented by factory medical services. The number of workers who require certain levels of factory medical care is specified.

Since 1954, the Department and Laboratory of Occupational Hygiene of each county sanitary epidemiological station has provided occupational hygiene services.

The professional direction and supervision of occupational hygiene and factory medical services is the responsibility of the National Institute of Occupational Health, founded in 1950, which also provides the academic base for postgraduate medical training in occupational health. There is relatively little undergraduate training, but postgraduate training consists of a six-week (210-hour) basic course for factory medical officers; this has an intake of 40–50 physicians each year. It is necessary to take this course to obtain the special qualification of factory medical officer. In

addition to the course, the applicant must spend five months in a hospital in the department of internal medicine, one month in a hospital traumatology department, two months in a Station for Epidemiology and Public Health Control, attend a course on toxicology, and work in a factory medical service for four years.

In parallel with the above, there is also a basic four-month (420-hour) course for hygienists, including one month (140 hours) of occupational health; this course is taken by 25–30 students annually.

A hygiene specialist is also required to train for three months in an isolation hospital, three months in a Station for Epidemiology and Public Health Control, and have four years' experience in hygiene.

After completion of basic medical training, two-week (70-hour) refresher courses are obligatory at five-year intervals; these bring participants up to date on both theory and practice.

Finally, there are one or two courses a year on special topics, open to physicians, chemists, biologists, and technical experts working in the field.

For the future, it is considered that, as the scope of occupational health becomes broader, more attention must be paid to the relationship between working processes and human beings, to ergonomic aspects, and to the earlier detection of quite minor physiological changes. At present, training is multidisciplinary in character to a certain extent, but it is already realized that there is a need for teachers to be drawn from a wider range of professions. Joint teaching of hygienists and physicians has been attempted, but has not always given very satisfactory results.

Italy

In Italy at present the position is fluid. Since 1970, workers have had the right to participate in the development of health protection measures and their representatives are empowered to evaluate the effectiveness of safety services. Since 1972, much of the centralized power of the State in the health field has been devolved to the regions, and in 1978 a fundamental reform of the National Health Service was started, which is still going on at regional level. At local level, health and social services have been combined and organized into five sectors. Essentially, occupational health is seen merely as one aspect of public health, and training in it is correspondingly part of training in public health.

Norway

Law No. 4 of 4 February 1977 on protection of workers and the working environment contains provisions making occupational health services compulsory when there is a risk of damage to health from the long-term

effects of factors in the working environment. Occupational health services were previously based on voluntary agreements, and were not subject to special legislation. Under the above-mentioned Law, the Directorate of Labour Inspection decides when and how many safety and health personnel are required in a factory, and the duties they are to perform. The Directorate of Labour Inspection is empowered to make regulations concerning the qualifications of occupational health personnel.

In Norway, medical students are given only six hours of formal training in occupational diseases and the working environment before they graduate.

In order to meet the demands of the Law of 1977, Parliament decided in the same year to establish a special training unit to provide a multidisciplinary intensive course in occupational health, primarily for personnel already working in the field. This basic course is of four weeks' duration, with 160 hours of theoretical education, and is intended for participants with experience of practical work in occupational health. The course consists of two parts, each lasting two weeks, separated by a period of four weeks for home study. Before attending the first part, students must study carefully the material forwarded to them by the training unit.

Three courses a year are held, providing training for a total of more than 100 students. So far, about 400 of those working in the field of occupational health have been trained in this way. The training unit comes under the Ministry of Labour and also plays a major role in further postgraduate training of occupational health personnel.

As already mentioned, the Directorate of Labour Inspection has the power to make regulations governing the qualifications of occupational health personnel. It is supposed to do this in cooperation with the organizations of the different professional groups.

The Norwegian Association of Occupational Health Physicians has planned a six-month postgraduate training course, including the basic multidisciplinary course already described. This is intended for the practising occupational health physician, to supplement the continuous training at plant level in problem solving, together with safety representatives, safety engineers, ergonomists and workers.

The regulations governing the specialty of occupational medicine are laid down by the Norwegian Medical Association, which also issues the specialist diploma, in cooperation with the Directorate of Labour Inspection. Training in the specialty, as for other medical specialties, is of 5–6 years' duration, including 1–2 years as an occupational health physician, 1–2 years at the Institute of Occupational Health, 1 year of clinical medicine, 1 year at the Directorate of Labour Inspection, etc. Specialists in occupational medicine work in occupational disease clinics at regional hospitals, and are therefore very few in number.

For occupational health nurses, it is planned to introduce postgraduate training of approximately six months, including the basic multidisciplinary course. The curriculum is subject to approval by the Directorate of Labour Inspection. A similar course for the postgraduate training of physiotherapists and ergonomists is now in preparation, as they play a central role in the occupational health team and in ergonomics in Norway.

Poland

In Poland, occupational health also forms part of the National Health Service and the industrial medical officer is paid by the State and not by industry. For historical reasons, due to the shortage of physicians in Poland after the Second World War, primary health care had to be brought closer to the key industrial towns. In 1946, about 500 physicians worked in industry, the majority of whom treated their work in industry as supplementary to their main activity. In 1952, industrial polyclinics were brought under the control of the Ministry of Health and at the same time the industrial health service was organized and began to deal with the problems of the working environment from the point of view of occupational hygiene and the health status of the workers, and to provide treatment for them if they became ill.

Instruction is given on the principles of occupational medicine in the last year of undergraduate training; a total of 114 hours of lectures and practical training is given. In addition, medical students undergo some 60 hours of practical training in an industrial health service outpatient department, during which they become acquainted with the conditions of the working environment, the principles of the evaluation of occupational hazards, the outpatient treatment of workers, and active medical prevention. Questions of fitness for work are also considered.

As far as postgraduate training is concerned, three institutes of occupational medicine have provided such training for industrial physicians since 1962. After a period of initial training (one or two weeks), the three institutes organize intramural training lasting 12 weeks and divided into two six-week periods. This is obligatory for physicians specializing in occupational medicine. A test is included and the whole training course ends in a final examination and the award of the appropriate certificate, without which a physician cannot enter for the specialist examination in occupational medicine. About 80 industrial physicians enter for this yearly. Subsequently, programmes of advanced training in occupational medicine, which include 80 hours of lectures and 120 hours of seminars and a standardized course programme, are provided by two of the institutes of occupational medicine. This training is obligatory for physicians taking the examination for the second degree of specialization.

A training course in occupational hygiene is open to physicians working in the occupational hygiene departments of sanitary epidemiological

stations. This course includes 250 hours of training, of which about 75% is practical, and lasts for a period of six weeks.

Refresher courses for industrial physicians are intended to be taken every four years and there are also specialized meetings on particular topics.

Sweden

Agreements between employers and employees, and guidelines laid down in accordance with these agreements, define occupational health services as an integral part of occupational safety and health. The focus is on the problems of the occupational environment and the approach is primarily preventive in character. A review of occupational health services in Sweden is currently in progress, covering the content of such services, their rate of expansion, and personnel training. The reviewing body — the Swedish Occupational Health Services Commission — has not yet made any recommendations. Proposals have, however, been put forward on the training of occupational health physicians. In summary, it is suggested that all such physicians should undergo specialized training which they should commence after registration and some four or five years of postgraduate experience. They should also hold specialist qualifications in general internal medicine or some other relevant field. The training, organized by the National Board of Occupational Safety and Health, comprises roughly nine weeks' theoretical instruction and is usually undertaken after an appointment in the occupational health services has been obtained.

As far as nurses are concerned, just as for occupational health physicians, the National Board of Occupational Safety and Health organizes a course for those already employed in occupational health services and another for those intending to become occupational health nurses. Both courses include eight weeks' theoretical instruction, and nurses not already employed in occupational health services also have to complete 12 weeks' practice.

As yet, no definite proposals have been made for the future training of occupational safety and hygiene engineers. For other groups, such as occupational health physiotherapists, specialized training is available.

In addition to these arrangements, specially trained occupational health service personnel can obtain short-term extension courses on specialized subjects, such as noise and vibration, silicosis, etc. The greatest problem at present is the shortage of specially trained personnel, as a consequence of the rapid expansion of the occupational health services, so that personnel are recruited before they have undergone specialized training. The basic training at undergraduate level of doctors, engineers, etc., does not cover occupational health adequately.

Union of Soviet Socialist Republics

In the USSR, occupational safety and health is a multidisciplinary and highly dynamic branch of practical and scientific activity. It is appreciated that there is a constant need to improve the knowledge of physicians, engineers, nurses, engineering technologists, employers and workers in order to keep pace with the developments in modern production methods. The whole problem has become both more important and more complicated of recent years. It is not only necessary to prevent occupational diseases and accidents, but also to establish the optimal conditions for preventing disease and promoting mental health. Furthermore, the prevention of delayed mutagenic, teratogenic and embryotoxic effects of occupational origin and the development of tumours has increased in importance, since these pathological processes can take place even at low levels of exposure to certain noxious factors. Finding solutions to such new problems in the field of occupational health is in close agreement with WHO's objective of attaining health for all by the year 2000. Any programmes towards this end should also include large-scale health education. Services at the national level need to be strengthened by medical specialists in genetics, oncology and teratology who are aware of all these problems and have taken a special interest in the aims, tasks and methods of occupational medicine. Occupational health services in the field (health centres at large enterprises, sanitary epidemiological stations) are used to provide training in pre-diploma practical work. The goal at this stage is to ensure that specialists will be able to identify and formulate the problems, collect and define the data, and try out the special measures directed towards the improvement of working conditions and the health care of workers.

The post-diploma advanced courses for occupational health specialists are designed to take account of the initial level of knowledge of the large group of physicians referred to above. The training programmes cover all the modern aspects of occupational health, and particularly the related disciplines, such as environmental protection. Scientific research institutes of occupational health play an important part in post-diploma training. They can provide such training in various ways and are better equipped for the thorough and comprehensive study of specific problems, thus promoting the involvement of practical workers in research and bringing research into occupational health practice.

There is also a need to improve education and training in the field of occupational hygiene at the design stage, a matter of concern to engineers, constructors, technologists, and experts in ergonomics and in occupational safety. Such training must be provided in polytechnics and technical schools and should be developed in collaboration with experts in

occupational health. As a backup to all this, there is a further need for short-term courses and seminars.

Employers and managers need appreciation courses so that they become aware of how best to use the various occupational health specialists available to them. Similarly, workers must be taught safe methods of work.

United Kingdom

Undergraduate teaching in occupational health is in general quite limited, though most medical schools devote a certain amount of time to the subject. There have been recent developments in the postgraduate field in the sense that the Royal College of Physicians has now established a specialized Faculty of Occupational Medicine and the subject is recognized as a specialty in the system of higher medical training. The Faculty is instituting two levels of qualification: Associateship and Membership. Associateship will require an examination after suitable training as well as experience in approved posts. This will be particularly appropriate for those entering the specialty and for those undertaking it part-time together with another clinical medical activity. In general, Membership will be attained by full-time consultant practitioners, who will also be eligible for specialist registration.

There is a strong tendency for greater use to be made of occupational health nurses, of whom there are around 9000 in the United Kingdom. Two levels of specialized training for nurses have also been established, the higher level leading to the Occupational Health Nursing Certificate, which requires a period of an academic year of full-time study or its equivalent.

The British Examining and Registration Board in Occupational Hygiene has introduced specialized certificate and diploma qualifications for hygienists, though much occupational hygiene work is still done by personnel not holding such a qualification. In general, it seems likely that in all these fields the specialized qualification will become an essential requirement for full-time specialist practitioners.

Various certificates and courses for safety advisers exist, but there is at present no unified system of qualification. For other specialists, such as ergonomists, health physicists and environmental health experts, there are specialized courses leading to various postgraduate qualifications. There has been of recent years a marked trend towards interdisciplinary cooperation, sometimes reflected in the organizational arrangements for health and safety services.

Yugoslavia

The training and education of occupational health personnel in Yugoslavia can be considered under three headings: undergraduate training of

physicians, postgraduate training in occupational medicine, and education and postgraduate training of other occupational health personnel. The undergraduate training given in the different medical schools varies both in timing and extent. In some, it is treated as a separate subject, in others combined with various related subjects, such as hygiene or health ecology. There are variations in the extent of the instruction given, but it is likely that a more standardized approach will be developed in the future. Specialized training in occupational medicine is provided in five of the republics and two autonomous regions, not through the Secretariat of Health but by medical faculties. Each candidate is required to complete a two-semester training course in occupational medicine. The duration of training, as for other specialties, is three years, with one exception. The number of hours spent on theoretical work varies from 250 upwards and this is combined with an allocation of time for practical work. The scope of the courses varies, but the main lines are similar. Postgraduate training has been on a large scale and there are now nearly 1000 specialists in occupational medicine in Yugoslavia and about the same number of physicians who have undergone a one-year or shorter course in that subject. Provision has also been made for longer courses for further specialization.

There are specially trained personnel in occupational safety, and one faculty has turned out several hundred safety engineers to diploma standard. More recently, one-year Master of Science courses have also been started. Individual institutions and postgraduate teaching centres provide training in medical toxicology, sanitary chemistry, health physics, sanitary engineering and similar subjects. Further advanced training for nurses and other workers is also being planned. Arrangements are in hand for considerable development in these areas in the next two or three years.

Other member states of the European Community

The organization of occupational medicine differs in the different countries, partly for historical reasons and partly because of the differences in the organization of health facilities in the countries. It is generally acknowledged that occupational physicians should be specially trained. France is a special case, since specialist training there lasts two years and begins during the sixth year of the course leading to the basic medical qualification. In all other countries this specialist training takes place, or is planned to take place, after the basic diploma has been obtained or after full registration. The duration of training is longest in Ireland (six to seven years). In the Netherlands, it takes three years to obtain the combined diplomas. In at least one country, Belgium, a decision does not seem to have yet been taken whether occupational medicine should be considered as a specialty in terms of the requirements of Article 2 of Directive No. 75/363.

As far as the subjects to be covered by training are concerned, there are differences in the attitude in the different countries to treatment services at the place of work as well as in the importance to be given to certain ethical considerations relating to the independence of health and safety services. There has also been some discussion as to the role of occupational health services in the study of absenteeism. In general, there is increasing recognition of the need for consultation with the social partners in the development of plans.

NEW PROBLEMS IN OCCUPATIONAL HEALTH

WHO has devoted much attention over the last ten years to various aspects of the problems that arise from:

(*a*) new technological developments; and

(*b*) new knowledge in biology.

There is now less emphasis on the detection and treatment of frank industrial disease, and more on looking at relatively minor physiological and biological, and particularly biochemical, reactions. In addition, there is increasing concern about mental and behavioural factors, as opposed to the obviously physical ones.

New technological developments

Occupational medicine must now concern itself, not only with the traditional problems of mortality and morbidity, but also with all types of work, including work outside industry, for example in research and in laboratories, and with effects other than the obvious physical ones. For example, the traditional stresses, which were mainly biochemical or physical in character, may now be replaced in large measure in certain types of occupation by psychological ones.

Labour-intensive industries are being replaced, certainly in the western world, by automated procedures requiring fewer workers; even clerical work is largely changing its nature and becoming something that can be done in a different fashion by computers with far fewer people. Concern with long hours of work or physical over-exertion may now shift to boredom and lack of individual purpose, involvement and motivation.

The whole of science and technology is changing its direction and new problems are coming within the sphere of occupational health, such as those in microbiology linked with genetic manipulation and the use of dangerous pathogens. Other examples concern new physical agents increasingly used in research and production.

New biological knowledge

Various previously accepted concepts, such as threshold limit values and the like, are no longer tenable. For carcinogens and sensitizers there may well be no definable threshold. As a result, "safe" and "unsafe" can no longer be regarded as two clearly defined concepts. Similarly, disease is not the whole picture; there is a whole range of biological effects, the significance of which is not necessarily understood in terms of prognosis. Increasingly, findings must be interpreted in terms of effects on the body that may or may not be prognostically significant. For example, an increasing effort is being devoted to the study of methods of monitoring exposure by biological means. Obvious examples include the study of various metabolites associated with exposure to well-known chemical hazards. Similarly, there is the increasing study of the biological significance of chromosome aberrations, or other cellular or biochemical changes, as a response to various agents. On a more refined plane, there is also evidence from the science of behavioural toxicology.

It is becoming increasingly difficult to interpret the significance of various biological responses in non-mammalian systems. For example, what is the significance of mutagenicity tests on bacteria? Concern has increased about genetic effects and about teratogenicity. These questions overlap with social considerations. For example, in a modern society, should women stop working in certain types of occupation where teratogenicity is a risk when the control of fertility is largely a matter of individual decision? These are not medical but social questions, but they are also questions to which occupational health experts must address themselves so that the correct guidance can be given to those who need an answer.

Social and political aspects

The answers to such questions are not purely scientific but also social and, to a certain extent, political in character. The one statement that can be made with confidence is that if the science is wrong then the social and political conclusions will also be wrong. How far is it necessary for scientists to discuss how public decisions are taken? Clearly, oversimplistic statements about safety and risk are not helpful. It is equally clear that, even though it is scientifically possible to assess the risk and to put it into numerical form, that is not of itself sufficient.

Another factor altogether has to be taken into account — not assessment of risk but perception of risk. Western societies view risks in ways that are quite different from those that would be immediately acceptable to the scientist. A very obvious example is that risks are accepted in travel by road that are of a far higher order than anything that would be accepted in

industry. This is not the place to discuss the whys and wherefores of that particular difference. Certain it is that those who are going to take a particular risk must be involved in the assessment of the acceptability of that risk. It is the scientist's responsibility to define the extent of the risk but it is then a matter of public policy and political decision-making to determine how much of that risk will be acceptable. In this second part of the argument the scientist takes part only as a citizen and not as an expert.

There is clearly an enormous need for the education of the public in this field. In today's agnostic society the assertions of experts are not automatically accepted. At the same time, press, television and radio are more interested in entertainment than in information and in excitement and drama than in calm explanations. It is necessary somehow to come to terms with this and to learn how to educate the public.

NEW REQUIREMENTS IN TRAINING

The functions of occupational health services were listed in the report on the 1972 Joint ILO/WHO Conference on the Teaching of Occupational Health and Safety,[a] which contained a review of such functions in certain industrialized countries (France, Netherlands, Sweden, United Kingdom, Yugoslavia). Since then, some new legislation has been promulgated, e.g. in the EEC countries, the German Democratic Republic and the Nordic countries, but in general this has not given rise to any major changes in the functions noted by the Joint Conference. There are some differences in the relations between the various functions, as compared to the situation in the early 1970s, but the changes in the priorities assigned to the individual functions have largely followed the lines laid down in the report.

At the same time, the tasks of the most important nonmedical professions in the occupational health field, namely (1) occupational health nurses, (2) industrial hygienists, (3) psychologists, and (4) safety engineers, were also listed in the report. The precise tasks of both the medical personnel and the other professions vary from country to country, but there is great overall similarity. However, the whole science of occupational health is changing as the nature of work itself changes. Far more is also being learnt about the fundamentals of biology and about the nature of the ill effects, mental and physical, to which people may be exposed. In

[a] *The teaching of occupational health and safety:* report on a Joint ILO/WHO Conference. Copenhagen, WHO Regional Office for Europe, 1974 (unpublished document EURO 5203).

addition, in most countries, the main emphasis is now on prevention, while the treatment and even the diagnosis of occupational diseases has been transferred to highly specialized clinics. In order to respond to this with appropriate changes in training, it will be necessary to assess both the changes in work and those in biological science. At the same time, doctors, nurses, scientists and engineers must be integrated into a multidisciplinary team. For this reason, the training of physicians cannot be considered in isolation, nor can that of occupational hygienists, nurses, safety engineers, and others. The choice then lies between multidisciplinary (integrated) and interdisciplinary training.

The term *multidisciplinary* (integrated) implies that a paradigm or approach common to several disciplines is used as an integrated approach made up of elements from several of the approaches of a number of disciplines, usually closely related to each other. The term *interdisciplinary* implies expert communication between various disciplines functioning on the basis of their own paradigms or approaches. In the case of training in occupational health, both approaches are needed.

Multidisciplinary (integrated) training

Multidisciplinary training in occupational health can be seen as a response to the need for the reform of medical training so as to take account of the development of other sciences (and especially the biomedical sciences, such as toxicology), other clinical sciences and medical chemistry, as well as certain specific medical sciences. The aim of such reform should be to inculcate a knowledge of the results of other sciences and their application to the practice of occupational health and occupational medicine.

Multidisciplinary training attempts to give the student new types of tools for his everyday medical practice and especially for his own personal use. Thus the development of toxicology has provided about 50 tests for the biological monitoring of exposures or the effects of various toxic chemicals. These tests can be routinely used with the help of a toxicological laboratory, but before a physician is able to request such tests and before he can draw correct conclusions from the test results he needs training in toxicology so as to acquire the necessary basic knowledge of the metabolism of various chemicals, the principles underlying the tests used, the sources of error, and the methods of interpreting the test results. The same is true when, for example, an occupational health physician is trained to make simple dermatological diagnoses or to produce audiograms. The most important areas to be covered by multidisciplinary training in occupational health are internal medicine, neurology, dermatology, pulmonology, orthopaedics, audiology, radiology, toxicology, ophthalmology and neurophysiology.

This type of training must be an integral part of postgraduate training curricula and take the form of both practical and theoretical training. The specialists responsible for instruction in the various multidisciplinary areas must be experts having a profound knowledge of their special areas, particularly in relation to occupational diseases in the specialty concerned. Thus the lecturer in neurology should have had several years' experience in neurological occupational diseases.

The multidisciplinary (integrated) approach is difficult to organize in training institutions where the full spectrum of specialists with experience of occupational diseases is not available; the interdisciplinary approach may then have to be adopted. The essential feature of multidisciplinary training is that, for example, a case of occupational disease is analysed by a group of experts who, although representing various specialties, deal with the problem jointly and reach a joint solution to it. The justification for this approach is that occupational medicine can no longer develop as an independent discipline but is more or less a synthesis of the various disciplines previously mentioned.

A number of problems arise in organizing multidisciplinary training: firstly, it is difficult in practice to induce representatives of different disciplines to attend the same lecture and to ensure that the instruction provided by various experts is at the same level, and secondly, the logic of multidisciplinary training may be quite different from that of discipline-oriented training.

In general, multidisciplinary training requires more effort on the teacher's part than does discipline-oriented training. The benefits of the multidisciplinary approach include, for example, more effective transfer of the most recent research results from the individual research areas to occupational health; at the same time, it ensures that the content of education is more relevant to practical life than with discipline-oriented training.

Interdisciplinary training

The purpose of interdisciplinary training is to give trainees the necessary skills, knowledge and attitude to enable them to collaborate and communicate with experts from other disciplines. Such training is therefore essentially training in general teamwork, in learning to make use of experts in other fields, and in learning how to give advice to them. This type of training is of the utmost importance, since the basic occupational health team consists of representatives of a number of different disciplines, e.g. physicians, nurses, industrial hygienists and safety engineers. In many countries this team will also include a psychologist.

The overall goal of interdisciplinary training should be to give trainees an understanding of the content, terminology and methodology of

the other areas such as to ensure that mutual understanding, communication and effective use of the skills of other experts is possible as a two-way process.

In order to achieve the above goal, the training curricula of the expert groups should be evaluated simultaneously and an agreement reached on the transfer of relevant parts of the curriculum from one area to another. Again, this is a relatively simple organizational process provided that all the relevant professional groups are trained in one and the same institution; it may be difficult if a number of institutions or disciplines are separately administered. Where institutes of occupational health exist as in Finland and in certain other countries, the organization of interdisciplinary education is comparatively easy. This approach provides an opportunity for joint training, so that interdisciplinary teams are already in existence during the training period.

An essential part of interdisciplinary training should be the instruction of students in the general principles of teamwork, including team psychology.

Preconditions for multidisciplinary and interdisciplinary training

As previously mentioned, the best possible arrangement is for one and the same institution to train all the relevant professionals for the occupational health team. This is possible provided that the training institution itself is able to provide instruction in the main specialized fields and that training is at the postgraduate level. To be able to provide multidisciplinary or interdisciplinary training, teachers in the training institutions should also be able to carry out multidisciplinary or interdisciplinary research and to acquire the necessary practical experience.

Technically, the most economic way to organize interdisciplinary training is to structure the training in the form of modules that can be put together to form the desired curricula. The modular principle makes it much easier to plan and integrate the functions of a number of separate training units and ensure that they work together; at the same time, it gives students maximal flexibility.

Practical training

Because occupational health is a highly practice-oriented and problem-oriented discipline, the training of students in practical skills is of the utmost importance. Universities usually have poor contacts with industry and the opportunities for obtaining such training are few. In general, it is highly beneficial if the training institution also performs certain duties in both the health services and in industrial hygiene. This enables on-the-job training, which is the most important part of practical training in

occupational health, to be provided. If this is not possible, adequate contacts between the training institutions and the occupational health services should be ensured by other means.

CONCLUSIONS

1. Occupational health specialists will have to become more highly specialized. However, at the same time, a large volume of work of a less specialized nature still remains to be done. For this reason, two grades of medical personnel are probably required in occupational health, the first dealing with the routine work and the second working essentially on a consultant basis.

2. Physicians entering industry require a far more detailed knowledge of the fundamental scientific bases of their work. It is true that this is interdisciplinary in character, but it is essential that the medical side should be properly scientific.

3. Members of the medical profession must accept that they are not necessarily primarily responsible for occupational health. It can be argued that the head of the occupational health team — and teamwork is essential — could be a scientist, a doctor, an administrator or an engineer. There has been a dangerous tendency in the past to accept it as inevitable that the doctor must be the team leader, an error into which WHO may also have fallen; this is certainly not always true, and the assumption must be avoided that there is a special place for doctors in the occupational health hierarchy.

4. The value of many routine medical tests should be questioned; what was useful, e.g. in the search for wrist drop or abdominal colic in the case of lead poisoning, or for other obvious clinical signs, is not now often relevant. When screening is carried out, it may be far more important to ensure that properly trained nurses are used to perform tasks often performed by doctors. Other professional groups will also make appropriate contributions.

5. More fundamental research will help to increase the understanding of biological mechanisms, and epidemiological studies will make it possible to convert biological measurements, e.g. liver function tests, chromosome aberrations, etc., into prognostic procedures.

6. Occupational medicine is fundamentally a clinical skill and its practitioners must be fully competent in clinical medicine. It is essential to remember that a large part of a doctor's work in industry lies in matching work to people and people to work.

7. There is an enormous need for development in the field of mental health, which is terribly confused, both by the careless use of words such as "stress" and by the slightly pious attitude that people should not be subjected to stress. It is obvious that some work is stressful but it is equally obvious that stress is in many cases beneficial.

8. There is a need for training in communication.

9. It must be realized that all important decisions must be shared, and that the results of scientific research must be made available to society for it to evaluate and use as it thinks fit.

Annex

LIST OF PARTICIPANTS

Temporary advisers

Dr H.A. Bernebury, International Harvester Company GmbH, Federal Republic of Germany

Professor D. Djurić, Chief, Department of Biochemistry and Toxicology, Institute of Occupational and Radiological Health, Belgrade, Yugoslavia

Dr K.P. Duncan, Director of Medical Services, Health and Safety Executive, London, United Kingdom (*Rapporteur*)

Professor J. Indulski, Director, Institute of Occupational Medicine, Lodz, Poland

Professor F. Kaloyanova, Director, Institute of Hygiene and Occupational Health, Sofia, Bulgaria

Professor M. Kilibarda, Director, Institute of Occupational and Radiological Health, Belgrade, Yugoslavia (*Chairman*)

Professor A.O. Navakatikyan, Deputy Director, Kiev Scientific Research Institute of Labour Hygiene and Occupational Diseases, Kiev, USSR

Professor B. Paccagnella, Director, Institute of Hygiene, University of Padua, Italy

Dr J.H. Rantanen, Director-General, Institute of Occupational Health, Helsinki, Finland (*Vice-Chairman*)

Dr A.B. Svindland, Directorate of Labour Inspection, Occupational Health and Safety, Oslo, Norway

Professor M. Timar, Director, National Institute of Occupational Health, Budapest, Hungary

Mrs Y. Wessman, Head of Division and Secretary of the Swedish Occupational Health Services Commission, Stockholm, Sweden

Representatives of other organizations

Dr W.J. Hunter, Commission of the European Communities, Directorate-General for Employment and Social Affairs, Luxembourg

Observers

Dr D. Popović, Institute of Occupational and Radiological Health, Belgrade, Yugoslavia

Dr M. Stanković, Institute of Occupational and Radiological Health, Belgrade, Yugoslavia

World Health Organization

Regional Office for Europe

Dr M.I. Mikheev, Regional Officer for Workers' Health (*Secretary*)

Dr J.M. Duffus, Consultant

OTHER RELEVANT WHO PUBLICATIONS

Continuing education of health personnel and its evaluation: report on the technical discussions at the twenty-ninth session of the Regional Committee for Europe. Copenhagen, WHO Regional Office for Europe, 1980 (EURO Reports and Studies, No. 33).

Health aspects of wellbeing in working places: report on a WHO Working Group. Copenhagen, WHO Regional Office for Europe, 1980 (EURO Reports and Studies, No. 31).

The environmental health officer in an industrial society: report on a WHO Consultation. Copenhagen, WHO Regional Office for Europe, 1980 (EURO Reports and Studies, No. 29).

Training of senior public health administrators: report on a WHO Working Group. Copenhagen, WHO Regional Office for Europe, 1980 (EURO Reports and Studies, No. 23).

WHO Technical Report Series, No. 647, 1980 (*Recommended health-based limits in occupational exposure to heavy metals*: report of a WHO Study Group).

Katz, F.M. & Snow, R. *Assessing health workers' performance. A manual for training and supervision*. Geneva, World Health Organization, 1980 (Public Health Papers, No. 72).

Katz, F.M. & Fülöp, T., ed. *Personnel for health care: case studies of educational programmes*. Vol. 2. Geneva, World Health Organization, 1980 (Public Health Papers, No. 71).

Health aspects related to indoor air quality: report on a WHO Working Group. Copenhagen, WHO Regional Office for Europe, 1979 (EURO Reports and Studies, No. 21).

Continuing education of health personnel as a factor in career development: report on a WHO Working Group. Copenhagen, WHO Regional Office for Europe, 1979 (EURO Reports and Studies, No. 6).

Health implications of nuclear power production: report on a Working Group. Copenhagen, WHO Regional Office for Europe, 1978 (WHO Regional Publications, European Series, No. 3).

WHO publications may be obtained, direct or through booksellers, from:

ALGERIA	Societe Nationale d'Edition et de Diffusion, 3 bd Zirout Youcef, ALGIERS
ARGENTINA	Carlos Hirsch SRL, Florida 165, Galerias Guemes, Escritorio 453/465, BUENOS AIRES
AUSTRALIA	*Mail Order Sales:* Australian Government Publishing Service, P.O. Box 84, CANBERRA A.C.T. 2600; *or over the counter from:* Australian Government Publishing Service Bookshops *at:* 70 Alinga Street, CANBERRA CITY A.C.T. 2600; 294 Adelaide Street, BRISBANE, Queensland 4000; 347 Swanston Street, MELBOURNE, VIC 3000; 309 Pitt Street, SYDNEY, N.S.W. 2000; Mt Newman House, 200 St. George's Terrace, PERTH, WA 6000; Industry House, 12 Pirie Street, ADELAIDE, SA 5000; 156–162 Macquarie Street, HOBART, TAS 7000 — Hunter Publications, 58a Gipps Street, COLLINGWOOD, VIC 3066 — R. Hill & Son Ltd., 608 St. Kilda Road, MELBOURNE, VIC 3004; Lawson House, 10–12 Clark Street, CROW'S NEST, NSW 2065
AUSTRIA	Gerold & Co., Graben 31, 1011 VIENNA I
BANGLADESH	The WHO Programme Coordinator, G.P.O. Box 250, DACCA 5 — The Association of Voluntary Agencies, P.O. Box 5045, DACCA 5
BELGIUM	Office international de Librairie, 30 avenue Marnix, 1050 BRUSSELS — *Subscriptions to World Health only:* Jean de Lannoy, 202 avenue du Roi, 1060 BRUSSELS
BRAZIL	Biblioteca Regional de Medicina OMS/OPS, Unidade de Venda de Publicações, Caixa Postal 20.381, Vila Clementino, 04023 SÃO PAULO, S.P.
BURMA	*see* India, WHO Regional Office
CANADA	*Single and bulk copies of individual publications (not subscriptions):* Canadian Public Health Association, 1335 Carling Avenue, Suite 210, OTTAWA, Ont. K1Z 8N8. *Subscriptions: Subscription orders, accompanied by cheque made out to the* Royal Bank of Canada, Ottawa, Account World Health Organization, *should be sent to the* World Health Organization, P.O. Box 1800, Postal Station B, OTTAWA, Ont. K1P 5R5. *Correspondence concerning subscriptions should be addressed to the* World Health Organization, Distribution and Sales, 1211 GENEVA 27, Switzerland
CHINA	China National Publications Import Corporation, P.O. Box 88, BEIJING (PEKING)
COLOMBIA	Distribuidora Ltd., Pio Alfonso Garcia, Carrera 4a, Nos 36–119, CARTAGENA
CYPRUS	Publishers' Distributors Cyprus, 30 Democratias Ave Ayios Dhometious, P.O. Box 4165, NICOSIA
CZECHO-SLOVAKIA	Artia, Ve Smeckach 30, 111 27 PRAGUE 1
DENMARK	Munksgaard Export and Subscription Service, Norre Sogade 35, 1370 COPENHAGEN K
ECUADOR	Libreria Cientifica S.A., P.O. Box 362, Luque 223, GUAYAQUIL
EGYPT	Osiris Office for Books and Reviews, 50 Kasr El Nil Street, CAIRO
EL SALVADOR	Libreria Estudiantil, Edificio Comercial B No 3, Avenida Libertad, SAN SALVADOR
FIJI	The WHO Programme Coordinator, P.O. Box 113, SUVA
FINLAND	Akateeminen Kirjakauppa, Keskuskatu 2, 00101 HELSINKI 10
FRANCE	Librairie Arnette, 2 rue Casimir-Delavigne, 75006 PARIS
GERMAN DEMOCRATIC REPUBLIC	Buchhaus Leipzig, Postfach 140, 701 LEIPZIG
GERMANY, FEDERAL REPUBLIC OF	Govi-Verlag GmbH, Ginnheimerstrasse 20, Postfach 5360, 6236 ESCHBORN — W. E. Saarbach, Postfach 101 610, Follerstrasse 2, 5000 COLOGNE 1 — Alex. Horn, Spiegelgasse 9, Postfach 3340, 6200 WIESBADEN
GHANA	Fides Enterprises, P.O. Box 1628, ACCRA
GREECE	G.C. Eleftheroudakis S.A., Librairie internationale, rue Nikis 4, ATHENS (T. 126)
HAITI	Max Boucheresu, Librairie "A la Caravelle", Boîte postale 111-B, PORT-AU-PRINCE
HONG KONG	Hong Kong Government Information Services, Beaconsfield House, 6th Floor, Queen's Road, Central, VICTORIA
HUNGARY	Kultura, P.O.B. 149, BUDAPEST 62 — Akadémiai Könyvesbolt, Váci utca 22, BUDAPEST V
ICELAND	Snaebjorn Jonsson & Co., P.O. Box 1131, Hafnarstraeti 9, REYKJAVIK
INDIA	WHO Regional Office for South-East Asia, World Health House, Indraprastha Estate, Ring Road, New DELHI 110002 — Oxford Book & Stationery Co., Scindia House, New DELHI 110001; 17 Park Street, CALCUTTA 700016 (*Sub-agent*)
INDONESIA	M/s Kalman Book Service Ltd., Kwitang Raya No. 11, P.O. Box 3105/Jkt, JAKARTA
IRAN	Iranian Amalgamated Distribution Agency, 151 Khiaban Soraya, TEHERAN
IRAQ	Ministry of Information, National House for Publishing, Distributing and Advertising, BAGHDAD
IRELAND	The Stationery Office, DUBLIN 4
ISRAEL	Heiliger & Co., 3 Nathan Strauss Street, JERUSALEM
ITALY	Edizioni Minerva Medica, Corso Bramante 83–85, 10126 TURIN; Via Lamarmora 3, 20100 MILAN
JAPAN	Maruzen Co. Ltd., P.O. Box 5050, TOKYO International, 100–31
KOREA REPUBLIC OF	The WHO Programme Coordinator, Central P.O. Box 540, SEOUL
KUWAIT	The Kuwait Bookshops Co. Ltd., Thunayan Al-Ghanem Bldg, P.O. Box 2942, KUWAIT
LAO PEOPLE'S DEMOCRATIC REPUBLIC	The WHO Programme Coordinator, P.O. Box 343, VIENTIANE
LEBANON	The Levant Distributors Co. S.A.R.L., Box 1181, Makdassi Street, Hanna Bldg, BEIRUT

A/1/81

WHO publications may be obtained, direct or through booksellers, from:

LUXEMBOURG	Librairie du Centre, 49 bd Royal, LUXEMBOURG
MALAWI	Malawi Book Service, P.O. Box 30044, Chichiri, BLANTYRE 3
MALAYSIA	The WHO Programme Coordinator, Room 1004, Fitzpatrick Building, Jalan Raja Chulan, KUALA LUMPUR 05–02 — Jubilee (Book) Store Ltd, 97 Jalan Tuanku Abdul Rahman, P.O. Box 629, KUALA LUMPUR 01–08 — Parry's Book Center, K. L. Hilton Hotel, Jln. Treacher, P.O. Box 960, KUALA LUMPUR
MEXICO	La Prensa Médica Mexicana, Ediciones Científicas, Paseo de las Facultades 26, Apt. Postal 20–413, MEXICO CITY 20, D.F.
MONGOLIA	*see* India, WHO Regional Office
MOROCCO	Editions La Porte, 281 avenue Mohammed V, RABAT
MOZAMBIQUE	INLD, Caixa Postal 4030, MAPUTO
NEPAL	*see* India, WHO Regional Office
NETHERLANDS	Medical Books Europe BV, Noorderwal 38, 7241 BL LOCHEM
NEW ZEALAND	Government Printing Office, Publications Section, Mulgrave Street, Private Bag, WELLINGTON 1; Walter Street, WELLINGTON; World Trade Building, Cubacade, Cuba Street, WELLINGTON. *Government Bookshops at:* Hannaford Burton Building, Rutland Street, Private Bag, AUCKLAND; 159 Hereford Street, Private Bag, CHRISTCHURCH; Alexandra Street, P.O. Box 857, HAMILTON; T & G Building, Princes Street, P.O. Box 1104, DUNEDIN — R. Hill & Son Ltd, Ideal House, Cnr Gillies Avenue & Eden Street, Newmarket, AUCKLAND 1
NIGERIA	University Bookshop Nigeria Ltd, University of Ibadan, IBADAN
NORWAY	J. G. Tanum A/S, P.O. Box 1177 Sentrum, OSLO 1
PAKISTAN	Mirza Book Agency, 65 Shahrah-E-Quaid-E-Azam, P.O. Box 729, LAHORE 3
PAPUA NEW GUINEA	The WHO Programme Coordinator, P.O. Box 5896, BOROKO
PHILIPPINES	World Health Organization, Regional Office for the Western Pacific, P.O. Box 2932, MANILA — The Modern Book Company Inc., P.O. Box 632, 922 Rizal Avenue, MANILA 2800
POLAND	Zakładnica Księgarska, ul Mazowiecka 9, 00052 WARSAW *(except periodicals)* — RKWZ Ruch, ul Wronia 23, 00840 WARSAW *(periodicals only)*
PORTUGAL	Livraria Rodrigues, 186 Rua do Ouro, LISBON 2
SIERRA LEONE	Njala University College Bookshop (University of Sierra Leone), Private Mail Bag, FREETOWN
SINGAPORE	The WHO Programme Coordinator, 144 Moulmein Road, G.P.O. Box 3457, SINGAPORE 1 — Select Books (Pte) Ltd, 215 Tanglin Shopping Centre, 2/F, 19 Tanglin Road, SINGAPORE 10
SOUTH AFRICA	Van Schaik's Bookstore (Pty) Ltd, P.O. Box 724, 268 Church Street, PRETORIA 0001
SPAIN	Comercial Atheneum S.A., Consejo de Ciento 130–136, BARCELONA 15; General Moscardó 29, MADRID 20 — Libreria Diaz de Santos, Lagasca 95 y Maldonado 6, MADRID 6; Balmes 417 y 419, BARCELONA 22
SRI LANKA	*see* India, WHO Regional Office
SWEDEN	Aktiebolaget C.E. Fritzes Kungl. Hovbokhandel, Regeringsgatan 12, 10327 STOCKHOLM
SWITZERLAND	Medizinischer Verlag Hans Huber, Länggass Strasse 76, 3012 BERNE 9
SYRIAN ARAB REPUBLIC	M. Farras Kakhia, P.O. Box No. 5221, ALEPPO
THAILAND	*see* India, WHO Regional Office
TUNISIA	Société Tunisienne de Diffusion, 5 avenue de Carthage, TUNIS
TURKEY	Haset Kitapevi, 469 Istiklal Caddesi, Beyoglu, ISTANBUL
UNITED KINGDOM	H.M. Stationery Office: 49 High Holborn, LONDON WC1V 6HB; 13a Castle Street, EDINBURGH EH2 3AR; 41 The Hayes, CARDIFF CF1 1JW; 80 Chichester Street, BELFAST BT1 4JY; Brazennose Street, MANCHESTER M60 8AS; 258 Broad Street, BIRMINGHAM B1 2HE; Southey House, Wine Street, BRISTOL BS1 2BQ. *All mail orders should be sent to* P.O. Box 569, LONDON SE1 9NH
UNITED STATES OF AMERICA	*Single and bulk copies of individual publications (not subscriptions):* WHO Publications Centre USA, 49 Sheridan Avenue, ALBANY, N.Y. 12210. *Subscriptions: Subscription orders, accompanied by check made out to the* Chemical Bank, New York, Account World Health Organization, *should be sent to the* World Health Organization, P.O. Box 5284, Church Street Station, NEW YORK, N.Y. 10249; *Correspondence concerning subscriptions should be addressed to the* World Health Organization, Distribution and Sales, 1211 GENEVA 27, Switzerland. *Publications are also available from the* United Nations Bookshop, NEW YORK, N.Y. 10017 *(retail only)*
USSR	*For readers in the USSR requiring Russian editions:* Komsomolskij prospekt 18, Medicinskaja Kniga, MOSCOW — *For readers outside the USSR requiring Russian editions:* Kuzneckij most 18, Meždunarodnaja Kniga, MOSCOW G-200
VENEZUELA	Editorial Interamericana de Venezuela C.A., Apartado 50.785, CARACAS 105 — Libreria del Este, Apartado 60.337, CARACAS 106 — Libreria Médica Paris, Apartado 60.681, CARACAS 106
YUGOSLAVIA	Jugoslovenska Knjiga, Terazije 27/II, 11000 BELGRADE
ZAIRE	Librairie universitaire, avenue de la Paix Nº 167, B.P. 1682, KINSHASA 1

Special terms for developing countries are obtainable on application to the WHO Programme Coordinators or WHO Regional Offices listed above or to the World Health Organization, Distribution and Sales Service, 1211 Geneva 27, Switzerland. Orders from countries where sales agents have not yet been appointed may also be sent to the Geneva address, but must be paid for in pounds sterling, US dollars, or Swiss francs.

Price: Sw. fr. 4 — Prices are subject to change without notice.